

Analyze Surface Charts

Module 5

Objective

Analyze isobars, troughs, fronts, pressure centers, isotherms, on a surface chart to the satisfaction of the evaluator as indicated by a Go/No Go checklist.

Surface Analysis

- The main goal of analysis is to locate and find phenomenon that has the potential of affecting the mission and your forecast

Uses of Surface Analysis

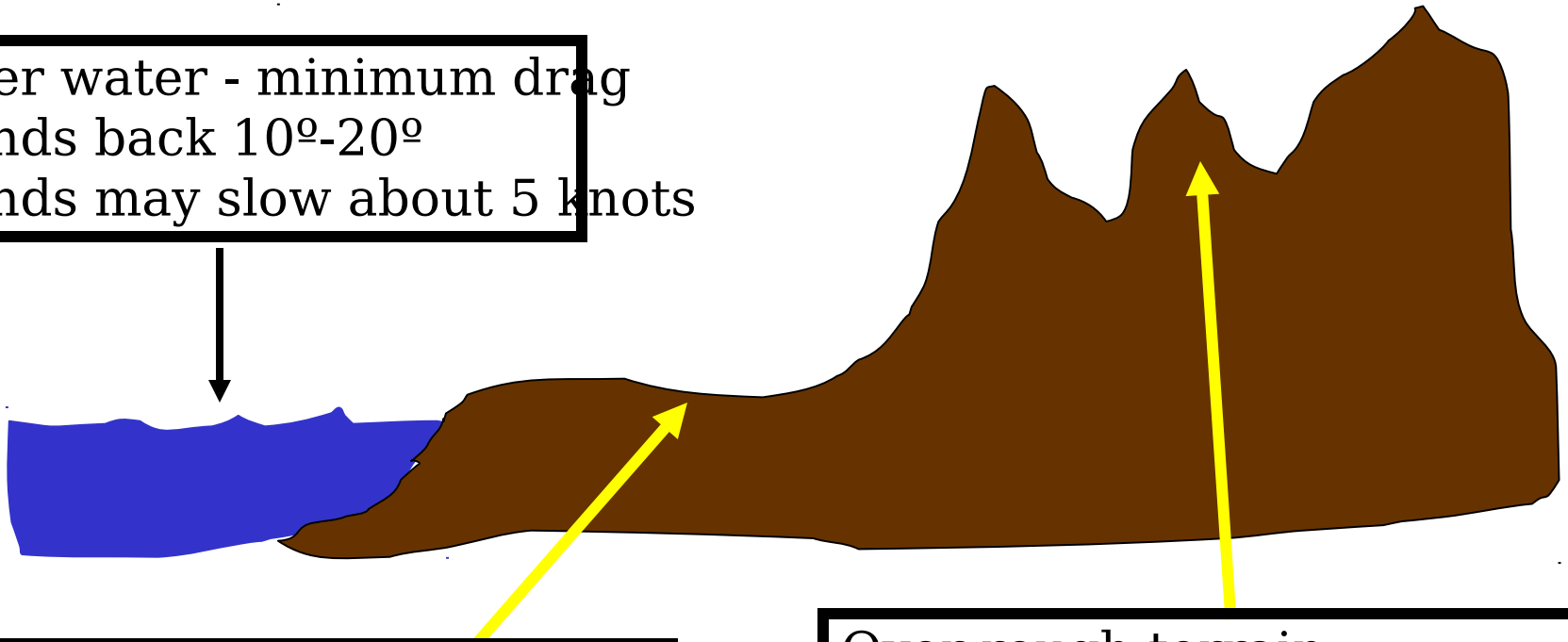
- Locating pressure systems
- Locating fronts
- Locating temperature trends and adve
- Determine surface winds

Analysis Considerations

- Isobars
- Pressure centers
- Troughs
- Isotherms
- Fronts
- Dew Point
- Wind Direction and Speed
- Present Weather
- Clouds
- Visibility

Frictional Effects

Over water - minimum drag
Winds back 10°-20°
Winds may slow about 5 knots

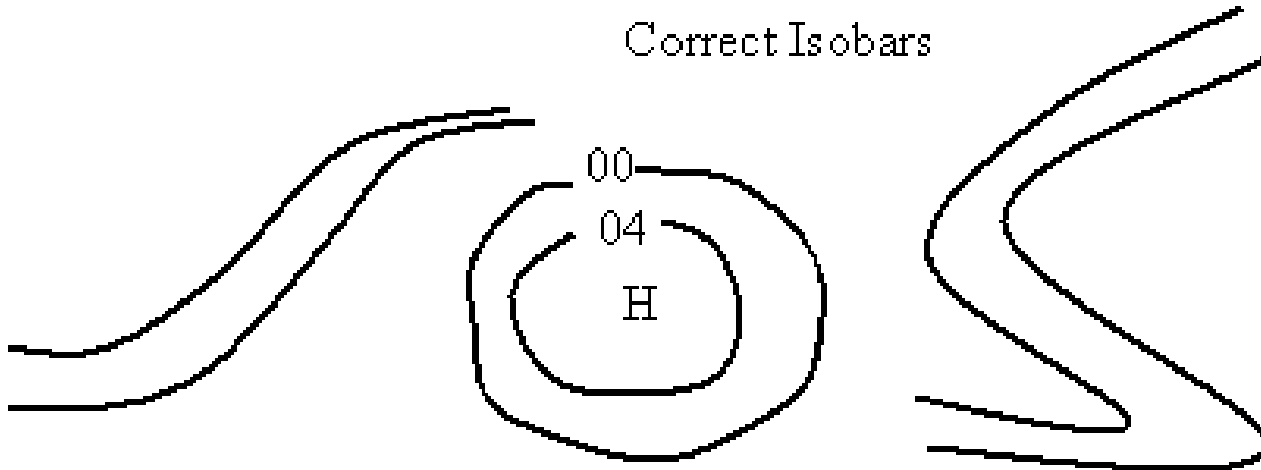


Over smooth terrain-
Moderate drag
Winds back 15°-30°
Winds may slow about 10 knots

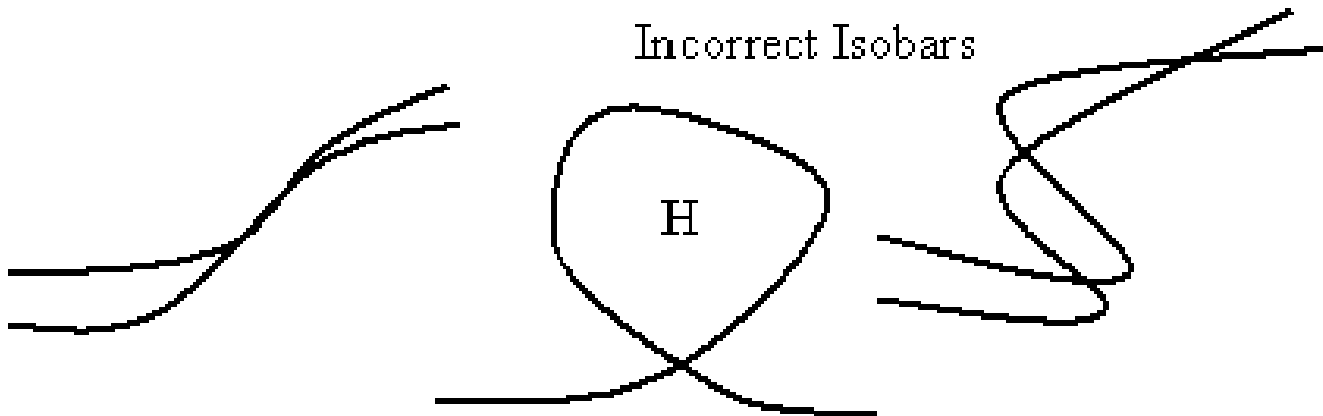
Over rough terrain-
Maximum drag
Winds back 20°-40°
Winds may slow about 10-15 knots

Analysis Procedures- Isobars

Correct Isobars



Incorrect Isobars



Purpose of Isobaric Analysis

- Shows small-scale features
- Isobars are drawn at intervals necessary to show detail

Analysis Considerations - Isobars

- Isobars must be drawn proportional to the pressure gradient
- Isobars must show an abrupt change in direction

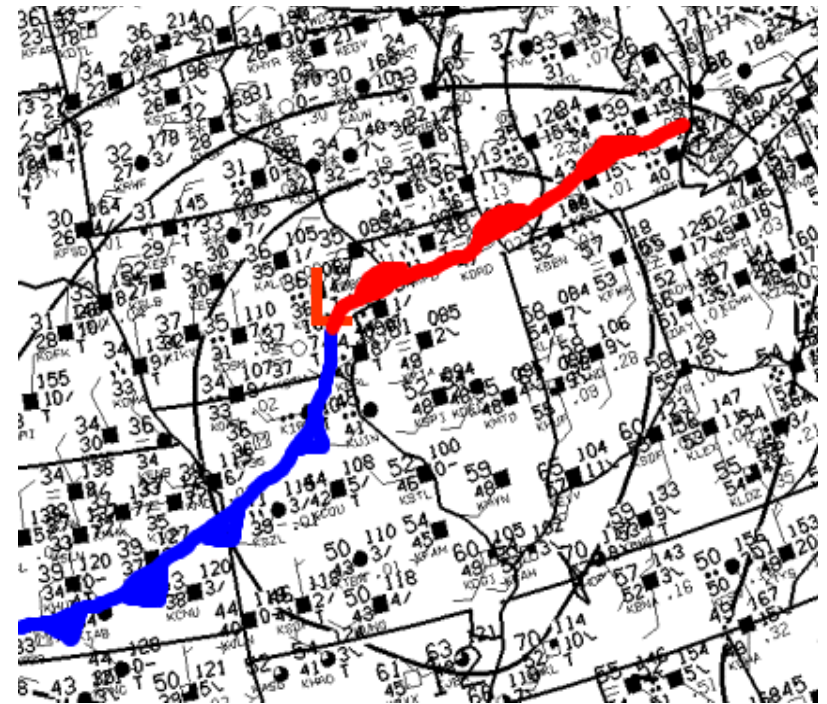
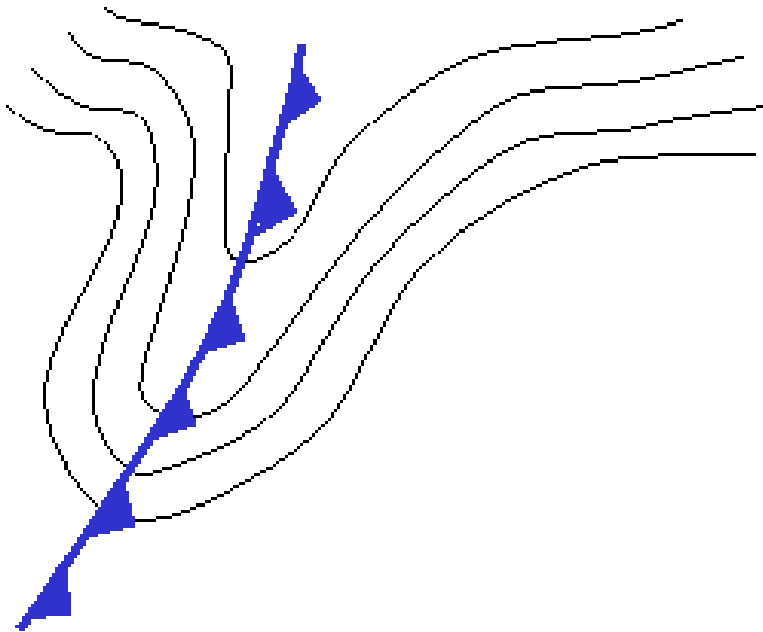
Analysis Procedures- Fronts

- Move at a percentage of the second standard level winds
- Shows logical continuity from previous positions
- Lie in troughs of low pressure

Analysis Procedures - Fronts

- Significant pressure tendency difference
- Cyclonic winds
- Dew point differences
- Fronts are on warm side

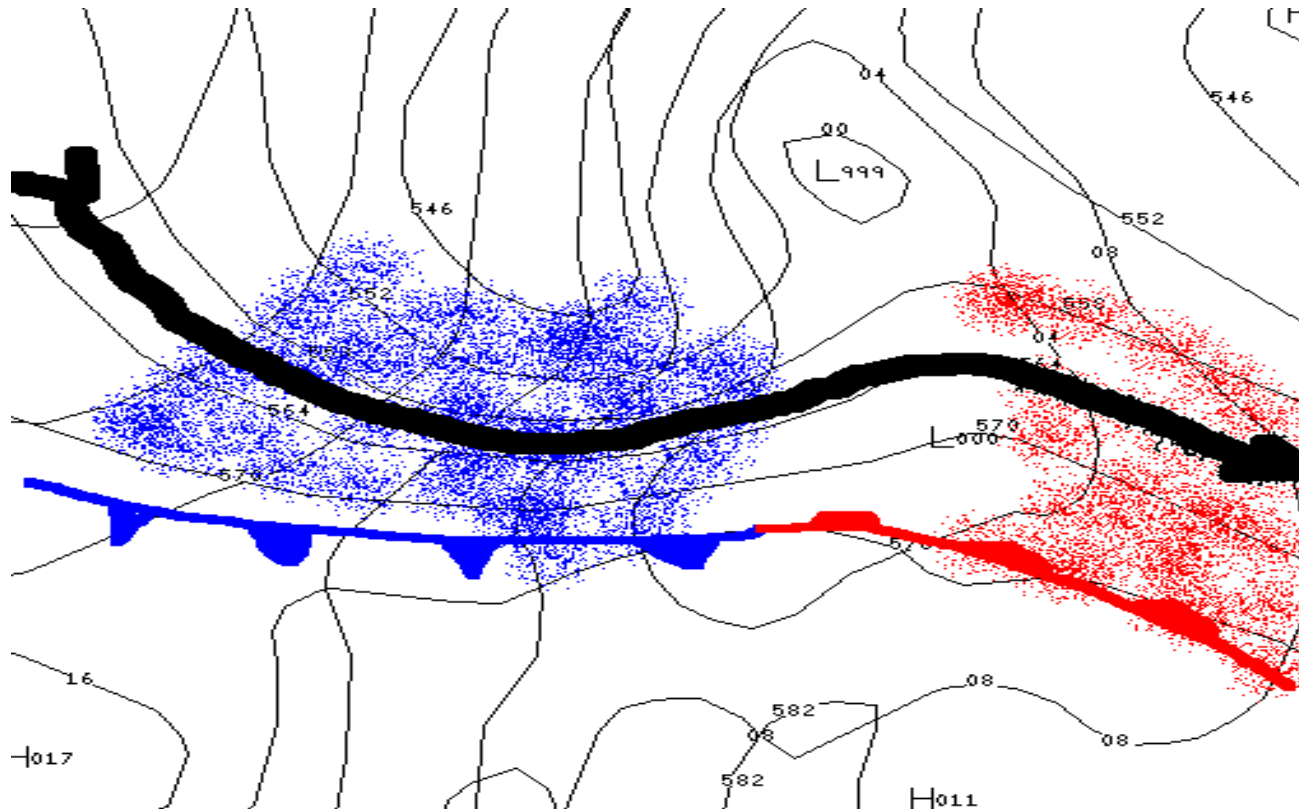
Frontal Analysis Procedures



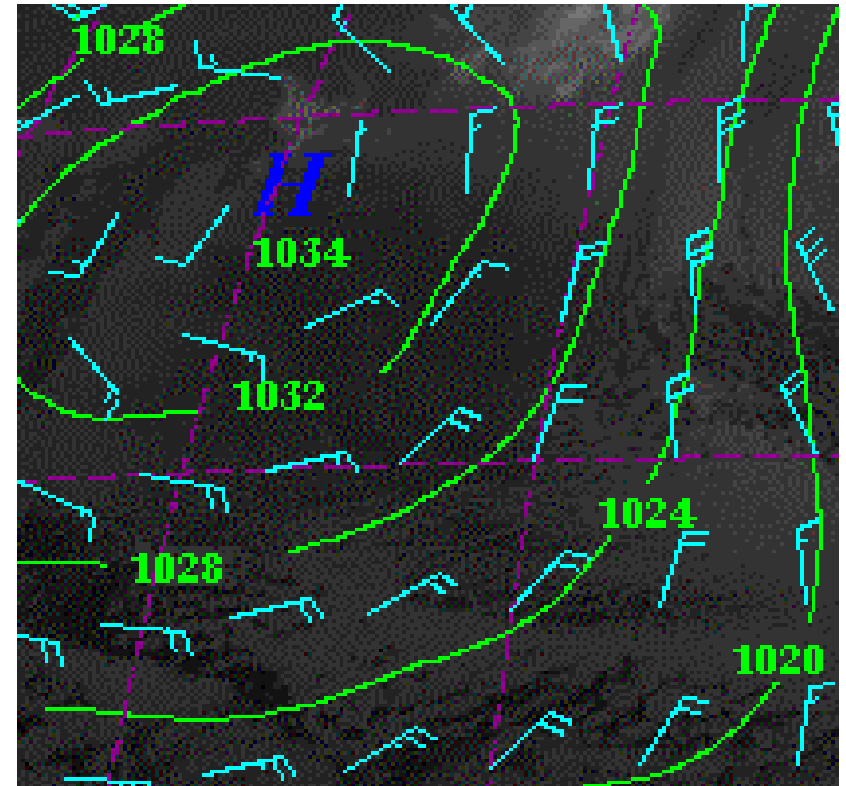
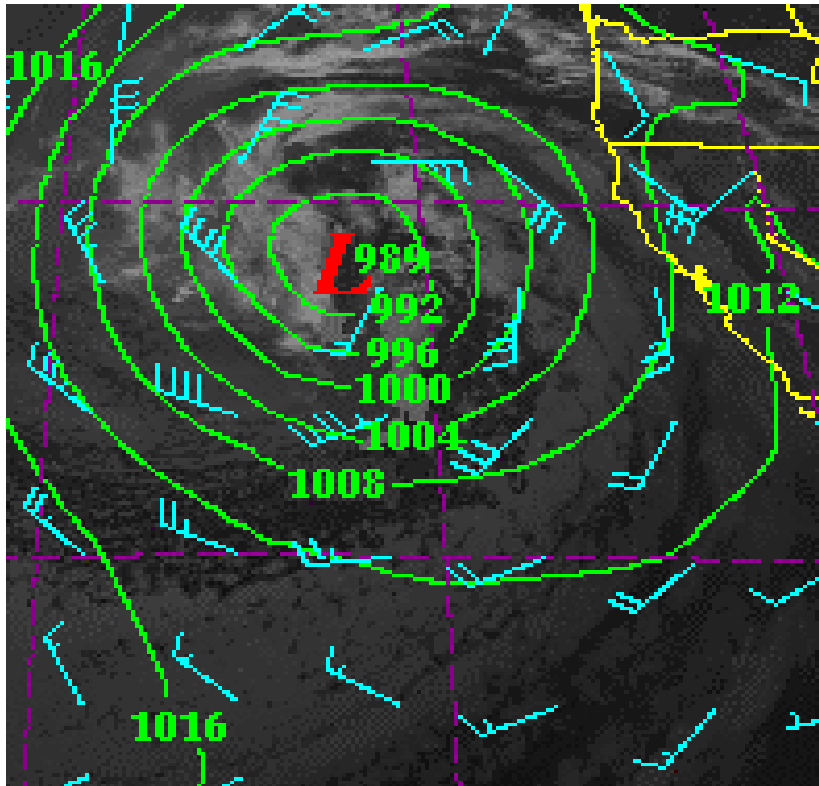
Occluded Fronts

- Occlusions form when a faster moving cold front catches up to a warm front.
- Occlusion occurs when less dense air is pushed up over more dense air.
- Occlusions may be labeled cold or warm

SFC/1,000-500 mb Thickness



Buys Ballot's Law

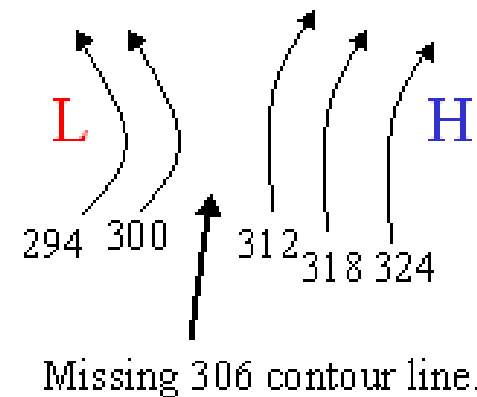
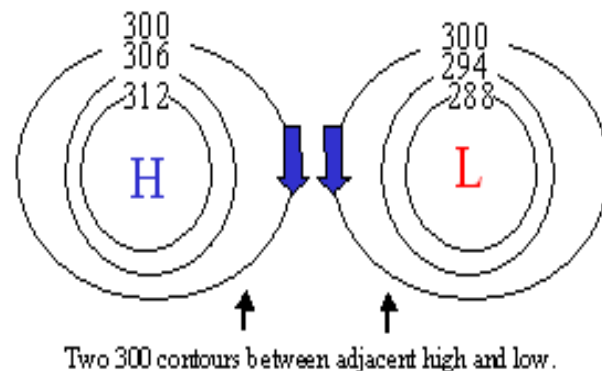
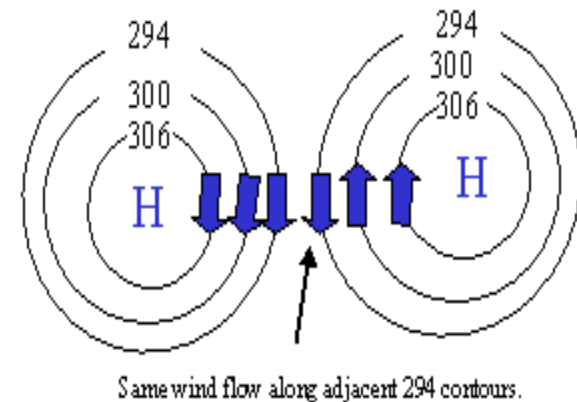
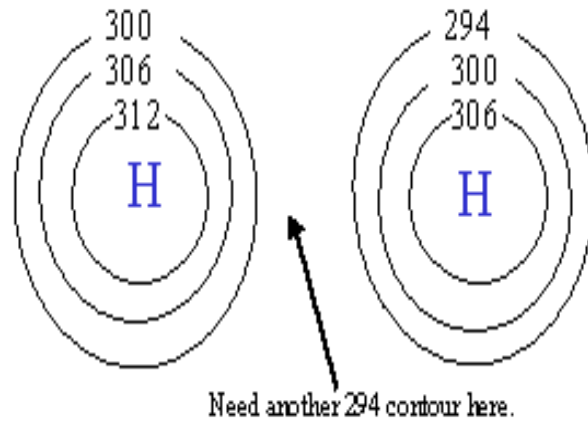


Analysis Considerations – Data Errors

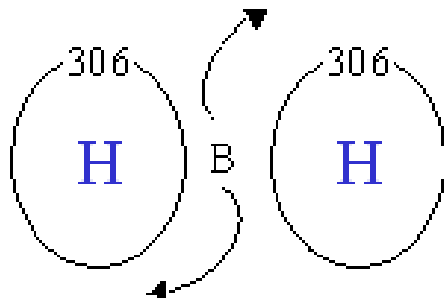
Data Representativeness – Not all
observations may be correct

- Sensor Representativeness
- Sea-Level Pressure
- Pressure Tendencies
- Temperature

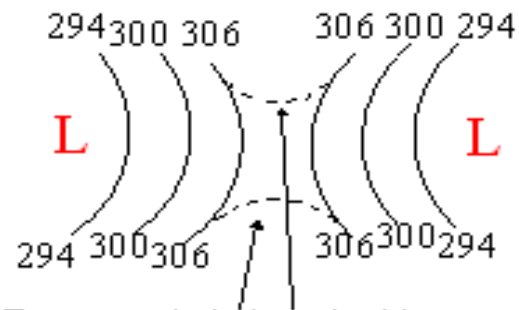
Common Isopleth Errors



Common Isopleth Errors



Wind flow reverses along contour B.



To great wind shear in this area.
Correction shown by dotted lines.

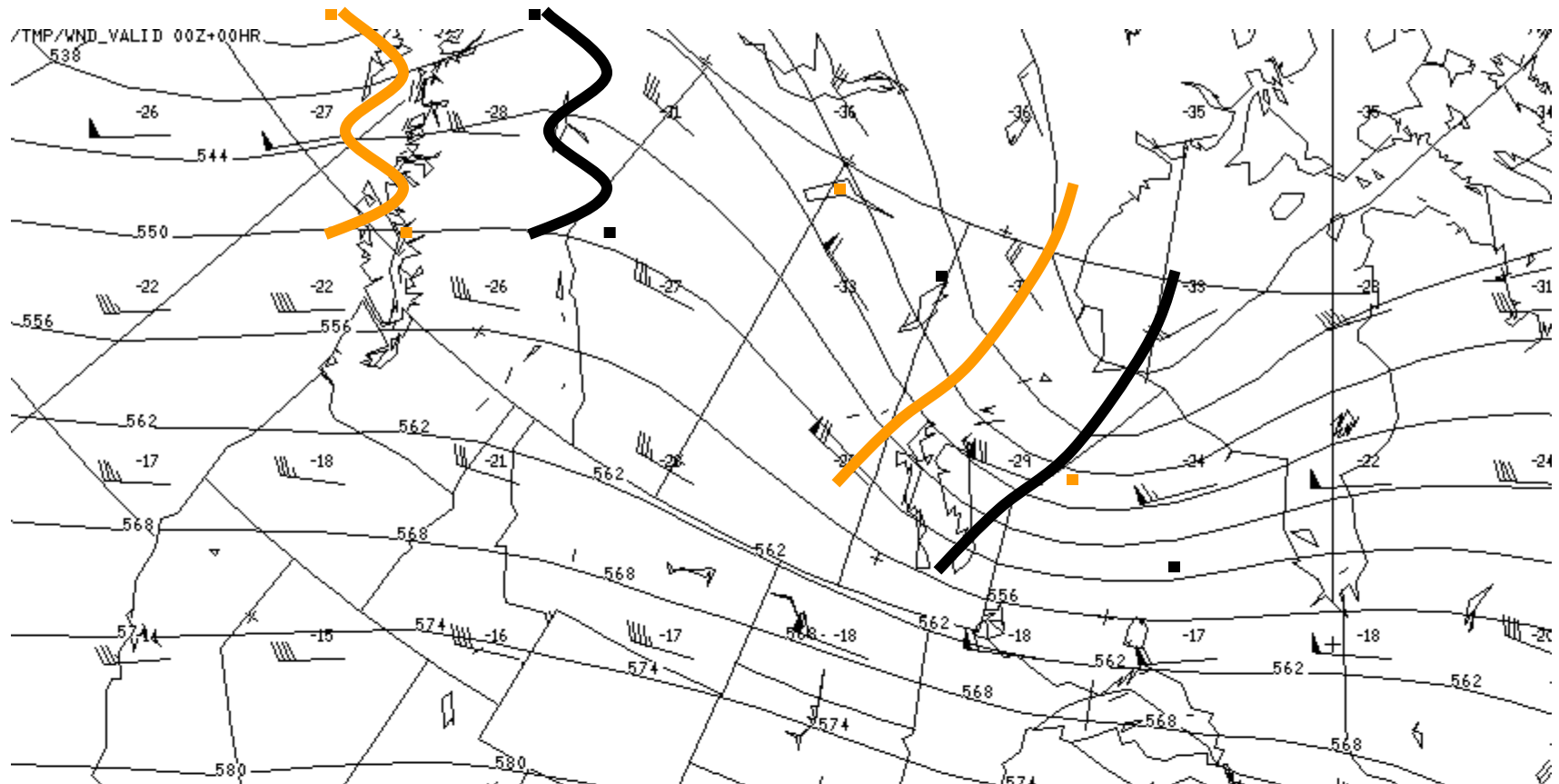
Common Analysis Errors

- Troughs analyzed as fronts
- Impossible stack
- Dropping of fronts
- Inconsistent continuity

Analysis Requirements and Procedures

- Continuity -- Logical progression from one product to the next
- Analyze for the data -- Consider all the data on an analysis as though the data is correct

Continuity



Analysis Considerations

Four analysis task considerations:

- Pre-analysis Orientation
- Isopleth Analysis
- Data Representativeness
- Analysis

Analysis Considerations

Analysis - Involves three stages:

- Preliminary Analysis
- Basic Analysis
- Final Analysis

Pre-Analysis Orientation

Review the history of the weather situation and check:

- Movements
- Configurations
- Orientation of fronts, lows, highs, troughs, and ridges
- General accuracy of past products

Analysis Tasks

- Examine the current state of the atmosphere
- Ensure each analysis follows in a logical progression

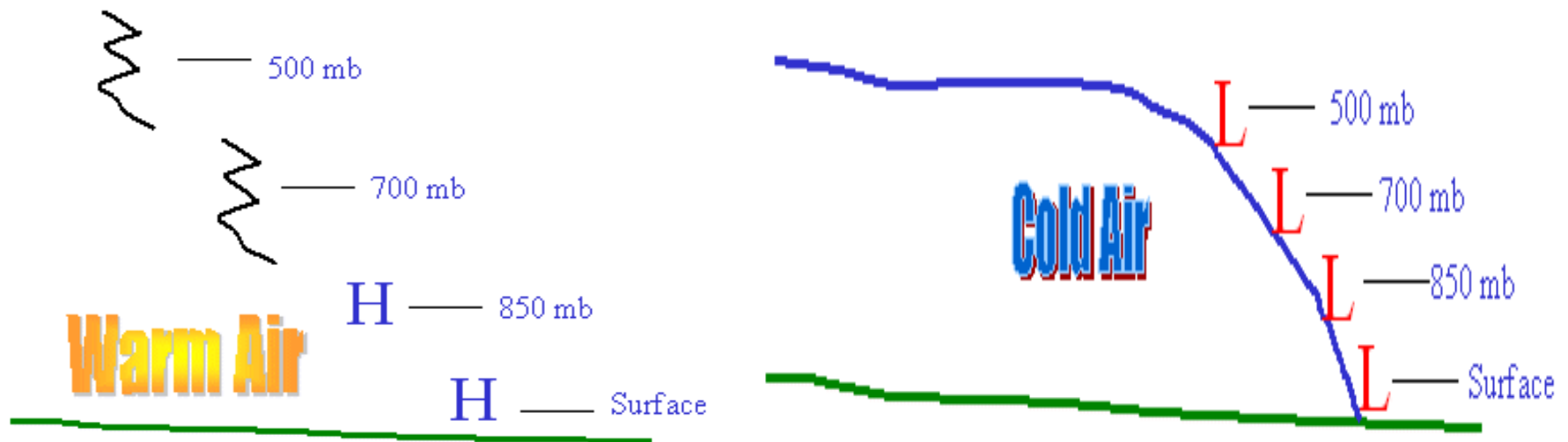
Analysis Procedures

- 850 mb chart:
 - A streamline will often show the existence of the frontal surface.
 - Isotherms packing indicates frontal location

Surface Analysis Rules

- One key to a good surface analysis is to use upper level features.
- Use upper air charts to assist you in stacking surface features
 - Cold fronts stack 1° to 3°
 - Warm fronts stack 3° to 6°
 - Baroclinic lows stack 1° to 3°
 - Barotropic lows and highs are nearly vertical.

Stacking



Conclusion

Any Questions?